

Claims

1. An electron beam recording apparatus comprising:

a rotational drive unit for rotationally driving a disk substrate having a surface on which a resist layer is formed;

an electron beam irradiation unit for irradiating an electron beam for exposure onto the surface of said resist layer in a freely deflectable manner;

a shift drive unit for shifting the irradiation position of the electron beam by a predetermined distance in the radial direction of said disk substrate for each one rotation by said rotational drive unit to advance the irradiation position of the electron beam; and

control means for forming a latent image corresponding to a predetermined pattern, in said resist layer by controlling the irradiation position caused by said electron beam irradiation unit on the surface of said resist layer in accordance with the rotation angle of said disk substrate caused by said rotational drive unit, the shift position caused by said shift drive unit and recording data that represents the predetermined pattern;

wherein said electron beam irradiation unit includes beam-adjusting means for adjusting the irradiation of said electron beam in such a manner as to spread over a plurality

of tracks in the direction of traversing the tracks on the surface of said resist layer in response to the irradiation position control by said control means.

2. The electron beam recording apparatus according to claim 1, wherein said beam-adjusting means is a high-speed deflector for deflecting said electron beam at a high speed in the radial direction of said disk substrate.

3. The electron beam recording apparatus according to claim 1, wherein said beam adjusting means includes an aperture plate provided with a one-track aperture and a plural-track aperture which is expanded by at least a two-track length in the radial direction of said disk substrate, and deflecting means for deflecting said electron beam so as to selectively pass through the one-track aperture or the plural-track aperture.

4. The electron beam recording apparatus according to claim 3, wherein said deflecting means is a blanking plate.

5. The electron beam recording apparatus according to claim 3, wherein said deflecting means is a high-speed deflector arranged between a blanking plate and the aperture plate.

6. The electron beam recording apparatus according to claim 1, wherein when the irradiation position of said electron beam is at a first predetermined track and the rotation angle of said

disk substrate is at a predetermined rotation angle, said beam-adjusting means continuously irradiates the electron beam over said first predetermined plural number of tracks in the radial direction of said disk substrate towards the outer periphery side of said disk substrate from said first predetermined track, and thereafter, when the irradiation position of the electron beam is at a second predetermined track that is apart from said first predetermined track by at least said first predetermined plural number of tracks towards the outer periphery side of said disk substrate and the rotation angle of said disk substrate is at said predetermined rotation angle, said beam-adjusting means continuously irradiates the electron beam over said second predetermined plural number of tracks in the radial direction of said disk substrate towards the outer periphery side of said disk substrate from said second predetermined track, so that a longitudinal continuous pattern longer than the track-to-track distance for said first predetermined plural number of tracks is formed as a latent image at said predetermined rotation angle of said disk substrate.

7. The electron beam recording apparatus according to claim 1, wherein said predetermined pattern is a pattern in which a servo zone and a data zone are repeated for each predetermined

angle, and the servo zone includes patterns extending over said plurality of tracks.

8. The electron beam recording apparatus according to claim 7, wherein the servo zone includes a mark part which contains at least one of a clock signal, an address signal for representing address information on a track and a position detecting signal for detecting a position on a track.

9. The electron beam recording apparatus according to claim 8, wherein said clock signal is formed in a servo clock area, said address signal is formed in an address mark area, and said position detection signal is formed in a position detection mark area, respectively.

10. An electron beam recording method comprising steps of:

a rotational drive step for rotationally drives a disk substrate having a surface on which a resist layer is formed;

an irradiation step for irradiating an electron beam for exposure onto the surface of said resist layer in a freely deflectable manner;

a shift drive step for shifting the irradiation position of said electron beam by a predetermined distance in the radial direction of said disk substrate for each one rotation of said disk substrate to advance the irradiation position of said electron

beam; and

a control step for forming a latent image corresponding to a predetermined pattern, in said resist layer by controlling the irradiation position of said electron beam on the surface of said resist layer in accordance with the rotation angle of said disk substrate, the shift distance of the irradiation position of said electron beam in the radial direction of said disk substrate and recording data that represents the predetermined pattern;

wherein said irradiation step irradiates said electron beam in such a manner as to spread over a plurality of tracks in the direction of traversing the tracks on the surface of said resist layer in response to the irradiation position control in said control step.